WHAT IS CLAIMED IS:

1. A method of charging a battery in a vehicle having an internal combustion engine configured to drive an alternator electrically coupled to the battery and adapted to charge the battery with a charge signal applied to the battery, the method comprising:

coupling to the battery through a four point Kelvin connection;

measuring a dynamic parameter of the battery using the Kelvin connection, the dynamic parameter measurement a function of a time varying signal;

determining a condition of the battery as a function of the measured dynamic parameter; and

controlling the charge signal in response to the determined condition of the battery.

2. The method of claim 1 wherein determining a condition of the battery includes determining a state of charge of the battery and wherein the charge signal is controlled according to the determined state of charge.

3. The method of claim 1 wherein controlling the charge signal comprises regulating a charging voltage applied to the battery according to the determined condition of the battery.

4. The method of claim 2 wherein controlling the charge signal comprises regulating a charging voltage applied to the battery according to the determined state of charge.

5. An apparatus for monitoring the condition of a storage battery while the storage battery is coupled in parallel to an electrical system of an operating vehicle, comprising:

a first electrical connection directly coupled to a positive terminal of the battery;

a second electrical connection directly coupled to a negative terminal of the battery, the first and second electrical connections coupled to a voltmeter to measure a time varying voltage across the battery;

a third electrical connection directly coupled to the positive terminal of the battery;

a fourth electrical connection directly coupled to a negative terminal of the battery, the third and fourth electrical connections coupled to a forcing function having a time varying component;

a current sensor electrically in series with the battery; and

a microprocessor configured to determine the condition of the battery as a function of a dynamic parameter of the battery based upon the measured voltage, the forcing function and the current sensed by the current sensor.

6. The apparatus of claim 5 further comprising an alternator electrically coupled to the battery and adapted to charge the battery with a charge signal

applied to the battery in response to an alternator control signal, wherein the alternator control signal is produced by the microprocessor as a function of the dynamic parameter.

7. The apparatus of claim 6 wherein the charge signal comprises a charging voltage.

8. The apparatus of claim 5 wherein the microprocessor is configured to determine a state of charge of the battery as a function of a dynamic parameter of the battery based upon the measured voltage, the forcing function and the current sensed by the current sensor.

9. The apparatus of claim 8 further comprising an alternator electrically coupled to the battery and adapted to charge the battery with a charge signal applied to the battery in response to an alternator control signal, wherein the alternator control signal is produced by the microprocessor as a function of the determined state of charge.

10. The apparatus of claim 9 wherein the charge signal comprises a charging voltage.

11. The apparatus of claim 9 wherein the microprocessor is further configured to produce a vehicle-performance-parameter control signal based upon the determined state of charge, wherein the vehicle-performance-parameter control signal controls a vehicle performance parameter that affects the magnitude of the charge signal applied to the battery.

12. The apparatus of claim 8 wherein the microprocessor is further configured to determine a state of health of the battery as a function of a dynamic parameter of the battery based upon the measured voltage, the forcing function and the current sensed by the current sensor, wherein the apparatus further comprises a computer memory device configured to store data regarding the starting performance of the battery as a function of state of health and state of charge, and wherein the microprocessor is further configured to determine a likelihood that the vehicle will start based upon the determined state of health, the determined state of charge and the stored starting performance data.

13. A method of determining the starting capability of a vehicle, comprising:

determining a state of charge of a vehicle battery;

determining a state of health of the vehicle battery;

determining a previous starting performance of the vehicle under similar conditions to the determined state of charge and state of health; and

determining a likelihood that the vehicle will start based upon the previous starting performance.

14. A method of controlling the charging rate of a vehicle storage battery during operation of the vehicle, comprising:

determining the state of charge of the battery;

charging the battery with a charge signal generated by an alternator; and

controlling a vehicle performance parameter based upon the determined state of charge, wherein the vehicle performance parameter is a parameter that affects the magnitude of the charge signal generated by the alternator.

15. A method of detecting that an initially installed vehicle battery has been replaced with a second vehicle battery, comprising:

measuring a value of a battery performance parameter;

calculating the difference between the measured value of the performance parameter and a predetermined value of the performance parameter; and

determining whether the initially installed vehicle battery has been replaced by a second battery based upon the difference between the measured value of the performance parameter and the predetermined value of the performance parameter.

16. A vehicle storage battery comprising:

a plurality of electrochemical cells, each having a plurality of positive plates and a plurality of negative plates;

an enclosure housing the electrochemical cells and having a positive terminal and a negative terminal disposed thereon;

a first connector electrically coupling adjacent cells to one another and electrically coupled to the positive terminal;

a second connector electrically coupling adjacent cells to one another and electrically coupled to the negative terminal; and

a computer data storage device contained in or coupled to the enclosure and adapted to store information regarding the battery, the storage device further configured to communicate with a device for testing the battery.

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